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PLANETARY PHENOMENA FOR MARCH AND APRIL, 1922

By MALCOLM MCNEILL

PHASES OF THE MOON, PACIFIC TIME

First Quarter,	Mar.	6, 11^h22^m A.M.	First Quarter,	April	4, 9^h46^m P.M.
Full Moon,	"	13, 3 14 A.M.	Full Moon,	"	11, 12 44 P.M.
Last Quarter,	"	19, 12 43 A.M.	Last Quarter,	"	18, 4 54 P.M.
New Moon,	"	28, 5 3 A.M.	New Moon,	"	26, 9 4 P.M.

The Sun passes the vernal equinox and spring begins March 21, 1^h49^m A. M., Pacific time.

The first of the two eclipses of the year is an Annular Eclipse of the Sun on March 28. No part of it will be visible in the United States except along the gulf coast east of New Orleans and Florida, where the beginning may be seen as a very small partial eclipse just after sunrise. The path of the annulus runs from the western part of South America across the Atlantic through northern Africa and Arabia, ending at sunset near the Persian Gulf.

Mercury is a morning star on March 1, rising about an hour before sunrise, and therefore not in a very good position for observation. It reaches its greatest west elongation, 27°32′, on March 12. This elongation is much above the average, as it occurs near aphelion; but as always happens for western elongations in the spring the planet is far to the south of the Sun, which materially lessens the interval between the rising of the planet and of the Sun. It will not be much more than an hour at best, and therefore will not afford a good opportunity for observation. After greatest elongation the Sun and the planet gradually approach each other and superior conjunction occurs on April 24.

Venus is an evening star, having passed superior conjunction on February 8, and is slowly increasing its distance from the Sun. On March 1 it sets only about half an hour after sunset, but by the end of April the interval increases to a little more than an hour and a half. During the month it moves 71° east and 21° north from the eastern part of *Aquarius* through *Pisces* and *Aries* into *Taurus*. On March 12 it passes about 1° south of the vernal equinox, and on April 29 it passes about 3° north of the *Pleiades* group in *Taurus*. On March 29 the Moon passes south of the planet, but both bodies are below our horizon at the time of nearest approach. It remains the brightest body in the sky except the Sun and Moon, although a full magnitude fainter than it will be in the autumn, when it will come to its maximum brightness.

Mars is rising earlier, shortly before 1 A. M. on March 1, and at about half after 10 P. M. on April 30. It moves 24° east and 4° south during the two months through the constellation *Scorpio;* on March 6 it passes about 6° north of the first magnitude star *Antares, α Scorpii.* On that date it is considerably brighter than the star which is a little below the standard first magnitude, and during the two months it will increase about one and one-half magnitudes. It will then be brighter than any of the fixed stars except *Sirius.* Its actual distance from the Earth is still diminishing very rapidly, from 109 millions on March 1 to 59 millions on April 30. On March 19 its distance from the Earth is the same as the Earth's mean distance from the Sun.

Jupiter and *Saturn* remain close neighbors in the evening sky, their distance apart diminishing from about 11° on March 1 to about 8° on April 30. Both rise before sunset on April 1, *Saturn* nearly an hour earlier than *Jupiter. Saturn* comes to opposition with the Sun on March 25 and *Jupiter* on April 4. Both are in the constellation *Virgo* and retrograding, *Saturn* moving westward about 4° and *Jupiter* nearly 7°. *Jupiter's* westward motion lasts from February 3 to June 6, covering an arc of regression of 9°. *Saturn's* lasts from January 18 to June 4 and covers an arc of about 6°. After the latter dates the planets resume their eastward motion, and as *Jupiter,* the more easterly, moves faster than *Saturn,* they will gradually pull farther and farther apart. During March and April the observer with a telescope will notice that the minor axis of *Saturn's* rings diminishes slightly. This is only temporary and later in the year the minor axis will again increase, but the minor axis will not reach its maximum breadth for several years. All of these changes are of course due to the position of the Earth relative to the plane of the rings, and go through their complete cycle in the period of *Saturn.* Jupiter is again nearly occulted by the

Moon on March 14 and April 10; both conjunctives occur during the evening in the United States.

Uranus passed conjunction with the Sun on February 28 and became a morning star, but remains too near the Sun for naked eye view. By the end of April it rises a little before 3 A. M. During the two months it moves about 3° eastward in the constellation *Aquarius.*

Neptune passed opposition with the Sun in early February and remains above the horizon the greater part of the night. It is in the eastern part of the constellation *Cancer* and moves westward about 1° up to April 24, and then resumes its eastward motion.

NOTES FROM PACIFIC COAST OBSERVATORIES

The Motion in Some A Double Stars

Seventh Note

The chief item on my observing program during the year 1921, as in the five preceding years, was the remeasurement of the A double stars. The observing conditions were good, especially during the summer and autumn months, but it was not possible to complete the program because so many of the stars on the list cross the meridian during the winter months. There are 102 of the 3000 published pairs for which no measures have been made at a second epoch; as many more, remeasured on one or more nights, are kept on the program for additional measures. Some of the pairs in this latter group are extremely close and very hard to measure.

In my earlier notes I have listed a number of the more rapidly moving pairs. The following table gives additional examples. The first star on the list, A 948, is entered as typical of many that have shown angular motion of approximately one degree a year without sensible change in the apparent separation of the components.